WHAT IS CLAIMED IS:

1. An airplane guidance method involving an inertial reference system and a GPS landing system, the airplane guidance method comprising:

converting position coordinates of an aircraft from the inertial reference system to runway, lateral, and vertical coordinates;

calibrating runway distance and lateral distance based on the converted position coordinates from the inertial reference system using runway distance and lateral distance from the GPS landing system with a third-order calibration filter when the aircraft is below a first height above terrain;

calibrating vertical distance based on the converted position coordinates from the inertial reference system using vertical distance from the GPS landing system with a second-order calibration filter when the aircraft is below the first height above terrain; and

using the calibrated runway, lateral, and vertical distances for deviation computations when GPS signals are interrupted below a second height above terrain.

2. The method of claim 1, further comprising determining a reference trajectory, the reference trajectory including horizontal and vertical positions, for the inertial reference system computed with velocity from the inertial reference system and initial position from the GPS landing system.

3. The method of claim 1, wherein the first height is 1500 feet.

4. The method of claim 1, wherein the third-order calibration filter converges when an error signal is within 0.15m for 30 seconds.

5. The method of claim 1, wherein the second-order calibration filter converges when an error signal is within 0.2m for 30 seconds.

6. The method of claim 1, further comprising generating airplane control signals based on the deviation computations.

7. The method of claim 1, wherein the GPS landing system comprises a ground station for generating differential global positioning system information.

8. The method of claim 1, wherein the velocity error state of the third-order calibration filter is initialized by velocity difference between velocity measurements in the GPS landing system and the inertial reference system.

9. The method of claim 1, further comprising buffering values from the GPS landing system and the inertial reference system before processing to ensure data integrity.

10. A method of deriving inertial-aided deviations for autoland systems during GPS signal interruptions, the method comprising:

generating global positioning positions;

generating inertial reference system positions; and

generating calibrated positions based on the global positioning positions and the inertial reference system positions using a third-order calibration filter and a second-order calibration filter.

11. The method of claim 10, wherein the calibrated positions comprise runway distance, lateral distance, and aircraft height.

12. The method of claim 10, wherein a velocity error state of the third-order calibration filter is initialized by velocity difference between velocity measurements in a BPS landing system and an inertial reference system.

13. The method of claim 10, further comprising providing airplane control signals using deviation computations from the generated calibrated positions when the calibration filters converge.

14. The method of claim 13, wherein the third-order calibration filter converges when an error signal is within 0.15m for 30 seconds.

15. The method of claim 13, wherein the second-order calibration filter converges when an error signal is within 0.2m for 30 seconds.

16. The method of claim 13, wherein the airplane control signals are provided using deviation computation when GPS signals are interrupted.

17. The method of claim 16, wherein aircraft height is 200 feet or less.

18. A system for deriving inertial-aided deviations for autoland systems during GPS signal interruptions, the system comprising:

a first component for generating global positioning positions;

a second component for generating inertial reference system positions;

a third component for generating calibrated positions based on the global positioning positions and the inertial reference system positions using a third-order calibration filter and a second-order calibration filter; and

a fourth component for providing airplane control signals using deviation computations from the generated calibrated positions when the calibration filters converge.

19. The system of claim 18, wherein the third-order calibration filter converges when an error signal is within 0.15m for 30 seconds; and wherein the second-order calibration filter converges when an error signal is within 0.2m for 30 seconds.

20. The system of claim 18, wherein the airplane control signals are provided using deviation computation when GPS signals are interrupted.